

# CUBA'S EMERGENCY MANAGEMENT AND THE NEED FOR A HOLISTIC UNDERSTANDING OF RISK

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A previous article (Aguirre, 2006) criticized the point of view that disaster programs in Cuba should be emulated by other countries. It pointed out that Cuba has an excellent record when it comes to disaster preparedness and response involving warning and evacuation, in which governmental control of the population and the effective organization of the society by the state are used very effectively to minimize the potential morbidity and mortality of hurricanes and tropical storms. However, Cuba has a very poor record in dealing with disaster reconstruction, recovery, and mitigation as well as with solving slow onset chronic environmental and socioeconomic problems and vulnerabilities of the population. The matters of vulnerability, resilience, and adaptive capacity of social and technological systems impacted by disasters have never been systematically examined much less made part of a concerted national program of recovery and mitigation. This chronic lack, what can be called a lack of holistic understanding of the nature of societal risk, is a key problem of social and economic development that would need to be addressed irrespective of the political system in place in the island.

## THE MANAGEMENT OF RISK

Modern understanding of social and cultural adaptation of human societies to their natural environment began in earnest with the warnings and solutions proposed by the environmental movement in the late 1960s and 1970s. Since then, it increasingly encompasses adaptation to dangerous natural processes and chemical spills and other technological disasters, which originally were studied mostly by sociologists

and geographers as a separate field and are now understood as part of societal risk management.

Unfortunately, so called natural disasters are often misunderstood as natural phenomena, when in reality they represent an interaction between the natural world and socio-cultural systems. Natural processes by themselves are not disasters. They become disasters when they impact with communities and regions that are vulnerable to their effects. Disasters are not natural; they are made by decisions, often seemingly unconnected to their ultimate consequences, of collectivities of people, and are caused by their inability or unwillingness to adopt sustainable patterns of living.

By convention, the scientific study of disaster identifies the following stages: preparedness, response, reconstruction, and recovery. Increasingly it is understood that each of the phases should be directed to maximize mitigation of the effects of disasters, which involve both rehabilitating and strengthening the built environment, and building new things in such a way so as to anticipate and mitigate and/or eliminate disastrous effects. Disaster management, and efforts at disaster mitigation, involves trial and error and collective social learning akin to cultural change, which is often the result of painful experience. It is thus useful to think of it in dialectical terms, as vulnerabilities, that call forth efforts to increase resilience and manage or mitigate the effects of disasters, which later on are found wanting, which then brings forth another round of management and mitigation. The roots of future vulnerability are often found in the very efforts to minimize present day problems.

Contrary to what is very often assumed, progress is not assured as the outcome of this sequence or process, for often unintended, dysfunctional consequences predominate, reminding us of the old adage that the "road to hell is paved with good intentions." In this context much can be learned from evolutionary biology and the concept of adaptive capacity, which shows that species that are well adapted to the equilibrium that exists at a given time in different systems such as the physical and biological environments, and climate regimes, often succumb to changes that in turn favor other life forms.

### THE CUBAN CASE

In the case of Cuba, the system of risk management is uneven. It is quite advanced in matters of public health, such as its programs of preventive medicine. Another good example of mitigation programs is the emphasis under way to create a national system of water reservoirs and canals to move water around the country to counter the differential effects of droughts and satisfy local population needs. It is deficient in managing the environment (Portela and Aguirre, 2000) and mitigating the effects of natural disasters.

Instead, disaster-related programs are mostly centered on preparedness and response. Emblematic of this emphasis are the "Meteoro" annual exercises often involving hundreds of thousands of people conducted throughout the island by the national Office of Civil Defense, in which the threats posed by hurricanes and earthquakes, to some degree, are determined through the use of maps of risks, and people are told what to do for protection. Cuba's Civil Defense is part of the Ministry of the Armed Forces (Ministerio de las Fuerzas Armadas Revolucionarias). It is organized as a military organization, with a National Civil Defense Command. It also has as members the presidents of the Provincial and Municipal Assemblies of Popular Power, who act as Chiefs of Civil Defense in their respective territories ([http://www.cubagob.cu/otras\\_info/minfar/defcivil/defensa\\_civil.htm](http://www.cubagob.cu/otras_info/minfar/defcivil/defensa_civil.htm)).

The effectiveness of Civil Defense's disaster preparedness and response systems for hurricanes is due in large part to its command of mass media, mass organizations, and local and regional governmental agencies at times of imminent dangers, and its ability to use the

excellent services of Cuba's Institute of Meteorology. It also has the legal right to mandate people to evacuate, and to enforce it if necessary through the use of force.

According to the National Geophysical Data Center (<http://www.ngdc.noaa.gov/nndc/struts/form?t=101650&s=1&d=1>), there have been 14 earthquakes and five tsunamis in Cuba during 1678–1992. Four of the five tsunamis occurred off the coasts of Santiago de Cuba, which is also the city site to nine of the fourteen known earthquakes. The City of Manzanillo, also in the Oriente region of the country, experienced an earthquake in 1992. The City of Havana experienced two, in 1693 and 1810, and Santa Clara one in 1939. The most destructive earthquake on record is the 1766 earthquake in Santiago de Cuba that killed 40 and injured 700 people. Unsurprisingly given this known risk, nowadays emphasis is placed on seismological assessment, with eight manned stations and a number of automatic telemetric stations in the Oriente region keeping track of seismic activities and sending information to a central institute in Santiago de Cuba (probably not the best place to have it since it is one of the most threatened cities in the country and it may be destroyed by earthquake during a major event). In a move towards mitigation, the National Center of Seismological Investigations (Centro Nacional de Investigaciones Sismológicas, CENAIIS) has developed risk maps and advises about where and what to build in areas prone to earthquakes, but to what extent this mitigation advice is followed is not known by this author.

Very troublesome is the lack of meaningful official programs attempting to minimize and mitigate the damage that is caused by the severe vulnerability of the man-made environment to the dangers emanating from hurricanes and earthquakes. As Dr. Batista Silva (2009) documents, and is well known by specialists in Cuba (Dr. Maritza Ballester, researcher at the Forecasting Center of the National Institute of Meteorology, is the author of the national prediction model and for years now has documented the increase in risk from hurricanes), hurricanes are becoming an increasingly serious risk to the viability of Cuban society.

Batista Silva points out, on the basis of exhaustive historical research, that the number and severity of hurri-

canes impacting Cuba has increased over the last 150 years or so, so that the last hurricane season (2008) caused very severe damage to the island, amounting to roughly 10 billion dollars and 600,000 destroyed and damaged homes, according to official government sources. Based on his estimates, even using moderate assumptions, it is plausible to expect that on average in the next 25 years or so, 6 to 8 hurricanes will impact Cuba every season, and 3 will be category 3 or higher storms. Thus, while it is true that the recent losses are extraordinary and hopefully will not be repeated, it should be clear to everyone that hurricane-related costs are very high and rising. The question is what can be done about it.

### RISK MANAGEMENT

The principles and practices of risk management in use in the United States, Canada, Europe, and other countries, as well as the science behind solutions to challenges caused by natural and man-made disasters such as hurricanes, produced by the disciplines of engineering, geology, hydraulics, geography, land use planning, sociology, and epidemiology, to mention some the most important fields, are generally well known by specialists in Cuba and should be relatively well known and accessible to decision makers.<sup>1</sup> They have developed a strong administrative structure and have available to them the technical manpower that would be required to transform Cuba's risk landscape. It is not worth repeating them here and at any rate it is not the place for it.

But some practices in Cuba that increase the vulnerability of the population and diminish their resilience and ability to minimize environmental and other types of risks are so important that they should be mentioned. Perhaps the most important of these is the militarization of the society and the use of hierarchical, centralized top-down systems of social organizations in all spheres of society that inhibit truly democratic citizen participation. Time and time again, as was discovered after the demise of the Soviet Union, in a number of very important contaminated sites in East-

ern Europe and in Russia, centralized economies and militarized regimes discouraged the attempts by civil society to mitigate social problems.

They also reduce the effectiveness of official programs in reducing or mitigating complex risks such as environmental pollution and disasters. The end result is that society fails to create in populations at risk of natural disasters new cultural understandings of the collective risks they face and of what they can do to improve their lives. Batista Silva writes (2009) that the town of Santa Cruz del Sur, which suffered from a destructive sea surge produced by hurricane Paloma in 2008, is going to be moved a few kilometers inland. If it happens, it will be the first example of land use planning I know that is done to decrease the vulnerability of people to hurricanes. A lot more needs to be known about this plan, for oftentimes it has happened in other countries that the new place used for resettlement causes more vulnerabilities and problems than the original location because the resettlement is done incorrectly, usually without consulting the community and analyzing its needs (Oliver-Smith, 1991).

There are very good reasons for the gradual emergence of an emergency management profession throughout the world side by side with the reduction or elimination of military solutions and top down centralized response to disasters (Dynes, 1994). The customary functions and responsibilities of military institutions are very often inefficient in solving the demands and requirements created by disasters, which by their very nature involve civil society. The military can impose order, make people to evacuate, and give an appearance of control, but cannot resolve conflicts and create solutions to community needs that have the support of important segments of the society. They cannot create the dynamics of people's participation in what are political processes, such as where and what to build, how the community should recover, and who should accept the costs of mitigation.

One of the key unresolved problems in Cuba is the need for intelligent and effective land use plans based

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1. Arguably, the best collection of scientific materials in the United States related to research on disasters available to the general public is at the University of Delaware's Disaster Research Center ([www.udel.edu/DRC](http://www.udel.edu/DRC)). It is visited by scholars from many countries and could be used by Cuban scientists.

on detailed risk mapping available to the public that will recognize the specific situations of all local areas in the island, provide sustainable solutions to their problems, maintain the integrity of the built environment against river and coastal flooding, sea surges, and earth dislocations, as well as protect the natural world. The other is how to make the housing stock in the island more resilient to high winds.

### INTERNATIONAL ASSISTANCE

Rather than emphasizing their negative features, hurricanes should be seen by Cubans in and out of Cuba as an opportunity to mobilize international aid to start this process of intelligent reconstruction, in which over the course of decades the adaptive capacity of the society is improved. The Cuban government needs to acknowledge that it needs international help, needs to create a transparent system of public administration and accounting that would guarantee that aid would flow to the intended communities and programs in Cuba, and needs to encourage international donors, governments, and the Cuban exile community, as well as other Cubans throughout the world, to assist in this needed reconstruction and recovery. It should be a national effort that transcends temporary political differences and factions with the goal of making the built environment more resilient to hurricanes and earthquakes.

There are available principles to guide the use of international aid. While the promise of international aid in disaster reconstruction is not a panacea, by now there are a number of excellent critiques and guidelines (Maren, 1997; Cuny, 1983; Easterly, 2006) that could assist the Cuban government in obviating the most pernicious of these problems while managing risk. Easterly's important criticisms of the World Bank's development assistance programs provide a set of principles that should be used to guide the needed effort to bring about disaster-resilient development projects in Cuba. They are: emphasize programs with tangible, measurable goals that are transparent in the relationships between efforts and results; oriented to satisfy specific objectives and solvable problems; clearly linked to what local people want and need; and offer specific benefits to local agents to provide the service people need (179–180). I would add that such pro-

grams should be sustainable and designed to mitigate known disaster risks.

In relation to reconstructing Cuba's built environment to make it more resilient, a growing literature could provide guidance to this national effort. Dainty and Boshier (2008: 363), in an after word to a book discussing how to integrate resilience into construction practice, list seven principles that dovetail to what I would recommend. They are: (1) adopt a holistic perspective; (2) develop and appropriately apply resilient technologies; (3) engage communities in resilience efforts; (4) use appropriate existing guidance and frameworks; (5) exploit opportunities to build-in resiliency measures post-disaster; (6) integrate built environment and emergency management professionals into disaster risk management; and (7) mainstream resilience into built environment curricula.

Needed are a reconsideration of building practices in the island to make them essential ingredients of risk management, the adoption of appropriate building codes tailored to local needs, and the consistent enforcement of building regulations. Importantly, we do not need to wait for another hurricane to strike the island but can start immediately in this process of structural mitigation. The people in Cuba faced with other pressing problems of daily living may think that mitigation can wait, but in fact, the experience in other countries throughout the world shows that the least expensive time to take care of these issues is before or even as part of economic development. It simply does not make sense to solve the vulnerabilities revealed by natural hazards at some future time, for then it cannot be done and the cost is much greater.

### FOREIGN EXPERIENCES

Irrespective of the political system in place, there are never easy answers and straightforward cost-free solutions, but without the effective democratic involvement in the reconstruction and recovery of people who are the potential victims, usually very little is accomplished of lasting value. It should be added that the inability of societies to solve the central problem of how to coexist with nature in a mutually satisfactory way is unfortunately not limited to the Cuban case.

## Chile

For example, Chile, which is said to be the most successful economy in Latin America, and a society that has improved its social and economic network of social welfare programs for its citizens, despite being one of the most dangerous places on Earth in terms of its great number of volcanoes, proneness to earthquakes, and length of exposed coastal area to tsunamis and storms, nevertheless has instituted very limited changes to reduce its risks as part of its development efforts. Thus, for example, (1) every year hundreds of buildings burn due to insufficient regulation of electrical systems, lack of certification of their electricians, and enforcement of the law; (2) untold number of houses are built every year in an informal way and in violation of the national building code, so that the recurrent earthquakes continue to destroy many houses; (3) active volcanoes are not monitored until they erupt, and there is no effective warning systems in place to alert populations at risk; and (4) the many economic programs now being put in place to develop the coastal areas for tourism do not have effective warning systems for tsunamis, or emergency evacuation plans.

## The Azores

Fortunately, societies have the capacity to change in positive ways. Such is the case of the Azores, a set of volcanic islands in the Atlantic Ocean that are part of Portugal. During centuries, the Azores were decimated by hundreds of earthquakes and many volcanic eruptions. Little was done about it other than invoke Divine Providence and accept the suffering as human fate.

Surprisingly perhaps, positive change is taking place. Delta Silva,<sup>2</sup> in her doctoral dissertation, is documenting how this change took place after the great earthquake of July 9, 1998 that shook Faial, Pico and São Jorge and measured 5.6 on the Richter scale with an epicenter NNE of the island of Faial. It caused damage to 7 parishes on Faial, in parts of Pico Island and in the far western part of the São Jorge Island. Eight persons lost their lives and close to 1,700 persons were left homeless.

In the aftermath of this disaster, with financial assistance from the European Union, the elected officials in the Azores and their mobilized constituencies paid for hazard maps and instituted new land use zones that declared certain areas of the islands unfit for human habitation. They also adopted a new building code to make their houses earthquake-resistant, which meant changing the architectural techniques and ways that buildings were constructed as well as the processing of basalt rock, which is the principal used in building. In the past, they used basalt volcanic rock to make the walls, which tended to collapse during earth movements and injure and kill people. Nowadays, the rock is pulverized and processed with other materials and plastics to create uniform building blocks that are light, very strong, and durable.

With these changes have come others, such as the use of differential rates of earthquake insurance that make living in houses built prior to the enactment of the building code very costly, as well as changes in the culture of the people so that they prefer to live in new homes that are demonstrably safer for them and their families. The few cases of fraud, misuse of power, and bribes that have occurred have been vigorously prosecuted, so that the new practices are considered normal and fair. There is no reason to assume that at least equal level of creativity would not take place in Cuba to mitigate the risks associated with hurricanes if allowed and encouraged by the state.

## CONCLUSION

Cuba must solve the hurricane problem. Contrary to what many people think, the hurricane problem is not an act of God, fate, or nature but is a problem caused by people. The solutions are known and must involve those who will otherwise be at risk of death and suffering. It will be complex, involving the use of land, the building industry, the ability of people to own and pay for their houses, the scientific communities, among others. And by definition it will involve the political and legal systems that are responsible to adjudicate interests in conflict.

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2. Delta Silva is a doctoral student I am mentoring. She is a social scientist at the Laboratório Nacional de Engenharia Civil, in Lisbon.

Cuba has shown tremendous inventiveness in reducing the mortality and morbidity associated with hurricanes, but its Achilles heel is the frailty of its buildings and other infrastructure to high winds, flooding, and sea surges. Given the increasing risks, its political lead-

ership must face this national problem. The solutions are known. The human resources are available. The question is where there is the political will to do the things that are needed.

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